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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,024	09/22/2003	Robert J. Frank	03CR045/KE	1422

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Attention: Kyle Eppele
Rockwell Collins, Inc.
M/S 124-323
400 Collins Rd. NE
Cedar Rapids, IA 52498

EXAMINER	
EJAZ, NAHEED	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 11/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/668,024	FRANK, ROBERT J.	
	Examiner	Art Unit	
	Naheed Ejaz	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 9 and 15 are objected to because of the following informalities:

2. As per claim 9, it recites, 'rearranging a sequence of the plurality of sub-dwell periods' (page # 16, line 11). In order to 'rearrange a sequence', there has to be arrangement of a sequence first. Appropriate correction is required.

3. As per claim 15, it recites, 'rearranging a sequence of the plurality of sub-dwell periods' (page # 17, line 10). There is no arrangement of a sequence of the plurality of sub-dwell periods claimed in order for them to be rearranged. Appropriate correction is required.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1-19 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility.

6. Claims 1, 9 & 15, taken as whole, do not provide any practical applicability of the claims inventions.

7. Claims 2-8, 10-14 & 16-19 are also rejected under 35 U.S.C. 101 because they are based on rejected independent claims, claims 1, 9 & 15 respectively.

8. Claims 1-19 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a specific and substantial

asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1, 4 & 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emi (6,047,018) in view of Kwon et al. (2006/0239334) (hereinafter, Kwon).

11. Regarding claim 1, Emi teaches, by definition nominal frequency is the midpoint in the pass band and Emi is teaching frequency hopping method utilizes a broad occupied frequency band width by hopping the carrier frequency of the modulated data according to a spread code pulse which is spread by balanced modulation of a direct spread code pulse (col.1, lines 25-31) and thus include the midpoint in the pass band associated with the respective frequency thus it reads on claim limitations of 'establishing a nominal transmission frequency'), 'establishing a dwell period' (see figure 1) (it is noted that in figure 1 time period between two hops T1 & T2 represents the dwell time (in the light of Specification) and read on claim limitations),'defining a predetermined frequency modulation pattern about the nominal transmission frequency, the predetermined frequency modulation pattern being suitable to vary the nominal transmission frequency during the dwell period' (col.2, lines 22-35) (it is noted that Emi is forming a combined pattern of seven frequencies of digital data by performing primary

modulation and based on these frequencies, frequency pattern is being selected (col.2, lines 22-27) which is equivalent to claim 'predetermined frequency modulation pattern about the nominal transmission frequency', 'dividing the dwell period into a plurality of sub-dwell periods, where each sub-dwell period has a nominal sub-frequency assigned thereto according to the predetermined frequency modulation pattern' (figure 1, elements T1,...T7 & F1,...F127). Moreover, Emi teaches, 'and transmitting the message according to the random ordering of the nominal sub-frequencies' (see Abstract).

Emi does not teach random ordering of sub-dwell period

Kwon teaches, 'randomly ordering the plurality of sub-dwell periods and the respective assigned nominal sub-frequencies' (figures 14e & 14f, page # 15, paragraph # 0237) (it is noted that Kwon is teaching time hopping in order to represent multidimensional hopping pattern by a two dimensional coordinate of transmission time and subcarrier (paragraph # 0237) which is equivalent to claim limitations of random ordering of sub-dwell periods since in figure 14e hop time t is divided on x-axis and have randomly ordered (time hopping (figures 12C & 12D, paragraphs # 0216 & 0237)). Furthermore, each hop interval or time has (claimed 'dwell time') frequencies associated with f_1, f_2, ..., f_4 on z-axis (figure 14E) (claimed 'assigned nominal sub-frequencies')).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the teachings of Kwon into Emi in order to distinguish the stations by the pattern in the respective squares while prevent the multidimensional hopping pattern collision by performing the time hopping and frequency hopping in

sparse channels as taught by Kwon (paragraph # 0237) thus enhance system performance.

12. As per claim 4, Emi teaches all the limitations in the previous claim on which claim 6 depends but he fails to disclose band-limiting filter.

Kwon discloses, 'band-limiting filter to each randomly ordered nominal sub-frequency' (figure 3B, elements 320 & 340, page # 2, paragraph # 0027, lines 17-19)

It would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the teachings of Kwon into Emi in order to limit the band according to desired frequency (well known in the art) and have the hopping pattern based on the limited band thus increase the system efficiency.

13. Refer to claim 6, Emi teaches all the limitations in the previous claim on which claim 6 depends but he fails to disclose pseudo-random number generator.

Kwon discloses, 'the random ordering of the nominal sub-frequencies is performed using a pseudo-random number generator' (figures 10A & 11, page # 12, paragraphs # 0214).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the teachings of Kwon into Emi in order to improve the performance of the multidimensional resource hopping multiplexing system, refining transmission for the collisions of multidimensional resource hopping patterns can reduce the overall perforation probability as taught by Kwon (see Abstract).

14. Claims 2, 3, 5, 9-12 and15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emi (6,047,018) in view of Kwon et al. (2006/0239334), as applied to claim 1 above, and further in view of Beamish et al. (6,865,216) (hereinafter, Beamish).

15. Refer to claim 2, Emi and Kwon teach all the limitations in the previous claim on which claim 2 depends but they fail to disclose varying the nominal sub-frequency during sub-dwell period.

Beamish discloses, 'for each randomly ordered nominal sub-frequency, varying the nominal sub-frequency during the respective sub-dwell period by one of increasing and decreasing the nominal sub-frequency' (figures 3 & 5, col.6, lines 13-25, 33-37 & 61-66) (it is noted that Beamish is generating the center frequency (claimed nominal frequency) which is controlled by the hopping sequence generator which in result generates the pattern of the frequency slots (claimed 'nominal sub-frequency') (col.6, lines 33-37)), 'transmitting the message at frequencies by which each randomly ordered nominal sub-frequency has been increased or decreased' (col.7, lines 4-22).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the teachings of Beamish into Emi and Kwon in order to increase data transmission rate within the currently available bandwidth by employing frequency hopping spread spectrum modulation as taught by Beamish (col.4, lines 36-39) thus increase system performance.

16. Refer to claim 3, in addition to aforementioned rejection of claim 2, Emi and Kwon teach all the limitations in the previous claim on which claim 3 depends but they fail to disclose increment of time for nominal sub-frequency.

Beamish discloses, 'increasing a time that the transmitted frequency transitions from one randomly ordered nominal sub-frequency to a next randomly ordered nominal sub-frequency' (see figure 3, elements Tc,...,6Tc, col.6, lines 13-25) (it is noted that the different frequency slots (claimed 'sub-frequency') are randomly ordered between time interval Tc to 2Tc and from 2Tc to 3Tc and so on (figure 3) which reads on claim limitations of increasing a time that the transmitted frequency transitions from one randomly ordered nominal sub-frequency to another).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the teachings of Beamish into Emi and Kwon in order to increase data transmission rate within the currently available bandwidth by employing frequency hopping spread spectrum modulation as taught by Beamish (col.4, lines 36-39) thus increase system performance.

17. Regarding claim 5, in addition to aforementioned rejection of claim 2, Emi and Kwon teach all the limitations in the previous claim on which claim 5 depends but they fail to disclose nominal transmission frequency being one of a plurality of frequency hops.

Beamish teaches, 'nominal transmission frequency is one of a plurality of frequency hops of a frequency hopping strategy, and wherein the dwell period is an amount of time the frequency hopping algorithm is configured to maintain the one of the plurality of frequency hops' (figures 3 & 5, col.6, lines 13-23, 33-37 & 61-66)

It would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the teachings of Beamish into Emi and Kwon in order to

increase data transmission rate within the currently available bandwidth by employing frequency hopping spread spectrum modulation as taught by Beamish (col.4, lines 36-39) thus increase system performance.

18. Claims 9 and 15 are rejected under the same rationale as mentioned in claims 1 & 2 rejections above. Moreover, it is noted that Kwon is teaching time hopping to represent multidimensional hopping pattern (paragraph # 0237) and in figure 14e & 12D hop time t is divided and arranged on x-axis and there is frequency associated with each hop which reads on claim limitations of 'rearranging a sequence of the plurality of sub-dwell periods and the respective assigned nominal sub-frequencies during the dwell period', 'for each rearranged nominal sub-frequency, varying the nominal sub-frequency during the respective sub-dwell period by one of increasing and decreasing the nominal sub-frequency; and transmitting the message at frequencies by which each rearranged nominal sub-frequency has been increased or decreased' (see claim 2 rejection above) (it is noted that in time hopping, time is being arranged or ordered in different position from their previous ones in order to hop, therefore, arranging or rearranging sub-dwell periods (time between hops) and transmitting the message based on them, would be inherent to time hopping).

19. Claim 10 is rejected under the same rationale as mentioned in the claim 3 rejection above.

20. Claim 11 is rejected under the same rationale as mentioned in the claim 4 rejection above.

21. Claim 12 is rejected under the same rationale as mentioned in the claim 6 rejection above.

22. Claim 16 is rejected under the same rationale as mentioned in the claim 2 rejection above.

23. Claim 17 is rejected under the same rationale as mentioned in the rejections of claims 3 & 4 above.

24. Claim 18 is rejected under the same rationale as mentioned in the claim 5 rejection above.

25. Claims 7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emi (6,047,018) in views of Kwon et al. (2006/0239334) & Beamish et al. (6,865,216), as applied to claims 1-3 & 5 above, and further in view of Lindsey (6,434,184).

26. Refer to claim 7, in addition to aforementioned rejection of claim 2, Emi and Kwon teach all the limitations in the previous claim on which claim 7 depends but they fail to disclose frequency jitter pattern.

Lindsey teaches, 'frequency modulation pattern is a frequency jitter pattern' (col.4, lines 65-67, col.5, lines 1-5).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the teachings of Lindsey into Emi, Kwon & Beamish in order to include jitter in the hop frequencies so that security concerns are satisfied as taught by Lindsey (col.4, lines 66-67, col.5, line 1) thus enhance system reliability.

27. Claim 13 is rejected under the same rationale as mentioned in the claim 7 rejection above.

28. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Emi (6,047,018) in view of Kwon et al. (2006/0239334), as applied to claim 1 above, and further in view of Nagazumi (5,084,901).

29. Refer to claim 8, Emi and Kwon teach all the limitations in the previous claim on which claim 8 depends but they fail to disclose frequency chirp.

30. Nagazumi teaches, 'frequency modulation pattern is frequency chirp characterized by one of an increase and a decrease in frequency during the dwell period' (figures 7a, 7b, col.1, lines 8-13, col.5, lines 63-68 & col.6, lines 1-12).

It would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the teachings of Nagazumi into Emi and Kwon in order to resist the noise and the variation of transmission line characteristics in the system by implementing generating a signal whose frequency is gradually changes (chirp system) for frequency hopping system as taught by Nagazumi (col.1, lines 26-38, col.21, lines 2-8) thus raises transmission performance.

31. Claims 14 & 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Emi (6,047,018) in views of Kwon et al. (2006/0239334) and Beamish et al. (6,865,216), as applied to claims 1, 2, 9 & 15 above, and further in view Nagazumi (5,084,901).

32. Claims 14 & 19 are rejected under the same rationale as mentioned in the claim 8 rejection above.

Conclusion

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- O'Connor et al. (4,677,617) disclose rapid frequency-hopping time synchronization.

Contact Information

34. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Naheed Ejaz whose telephone number is 571-272-5947. The examiner can normally be reached on Monday - Friday 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Naheed Ejaz

Examiner
Art Unit 2611

N-E
11/17/2006

PANKAJ KUMAR
PRIMARY PATENT EXAMINER

PANKAJ KUMAR
PRIMARY PATENT EXAMINER